CASE REPORT

Pulmonary cavitary lesion and haemoptysis: rare aetiology on biopsy

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SUMMARY

Pleomorphic carcinoma of the lung is a rare form of malignancy that can present similarly to other necrotising cavitary lung diseases. We present a case of a Caucasian woman who presented with recurrent haemoptysis and a right upper lobe cavitary lesion on CT scan. She underwent selective embolisation of the right bronchial artery by interventional radiology to control her haemoptysis. Positron emission tomography/CT scan was performed which showed significant fluorodeoxyglucose uptake in the right upper lobe cavitary lesion. There was a discussion among her providers about the aetiology of this lesion including infection and malignancy. Cultures from bronchoalveolar lavage and blood were negative for infection as the patient underwent right upper lobectomy which showed invasive sarcomatoid pleomorphic carcinoma with a minor component of acinar adenocarcinoma. She was diagnosed with stage IB (T2aN0M0) sarcomatoid pleomorphic carcinoma and underwent adjuvant chemotherapy after her lobectomy with recurrence and metastasis to her stomach and pancreas.

BACKGROUND

Pleomorphic carcinoma of the lung is a rare malignancy that carries a worse prognosis compared with non-small cell lung cancer (NSCLC). Since this type of cancer can grow and invade the bronchial tree and parenchyma, pleomorphic carcinoma may present similarly to other causes of cavitary lung disease such as necrotising pneumonia, mycobacterial infection, septic pulmonary emboli, aspergillosis and other forms of cancer. Although positron emission tomography (PET)/CT scan is often used as part of the evaluation for malignancy, it remains limited in its ability to distinguish cancer from infection. We present this case because it reinforces the inclusion of pleomorphic carcinoma in the differential for patients presenting with cavitary lesion, and highlights the importance of tissue examination in reaching the correct diagnosis.

CASE PRESENTATION

A 70-year-old woman with a history of left breast cancer and a former smoker, presented with worsening cough and development of haemoptysis. The patient was in her usual state of health until 8 weeks prior to presentation when she developed dry cough that progressed to blood-streaked sputum. She denied fevers, weight loss, night sweats and dyspnoea. Her medical history is significant for infiltrating ductal carcinoma (oestrogen-receptor positive, BRCA gene negative) of the left breast for which she underwent lumpectomy, radiation and hormonal therapy. Family medical history was remarkable for the father and mother both of whom were smokers and died of lung cancer and a sister with BRCA gene mutation. She has a 15-pack year smoking history and quit over 38 years ago with no alcohol or drug history.

She was referred to the Jo-Ann LeBuhn Center for Chest Disease at Columbia University Medical Center as chest X-ray showed a right upper lobe cavitary lesion. CT scan of the chest showed a 4.5 cm×4.5 cm×4.1 cm cavitary lesion in the right upper lobe with thick nodular rim and surrounding ground glass opacities (figure 1). Ground glass and nodular opacities were seen in the right middle and lower lobes, and the left lower lobe concerning for haemorrhage given her recent haemoptysis. She underwent bronchoscopy, which was significant for fresh, thin blood in the trachea with active bleeding from the right upper lobe anterior segment. Bleeding was controlled with cold saline and epinephrine. No endobronchial lesions were seen and transbronchial biopsies were deferred due to bleeding. Cultures and cytology were negative from bronchoalveolar lavage. The patient was immediately admitted to the hospital for expedited evaluation of her right upper lung lesion and haemoptysis. Given the persistent haemoptysis and findings on bronchoscopy, the patient underwent selective embolisation of the right bronchial artery. Owing to her haemoptysis and cavitary lesion on imaging, there was concern for infectious aetiology in addition to malignancy. The patient had PET/CT scan performed which showed the right cavitary lesion with standardised uptake value (SUV) 25.5 and right paratracheal lymph node with SUV 3.6 (figure 2). The patient did not have further episodes of haemoptysis and underwent elective right upper lobectomy with lymph node dissection of levels 4, 7, 10 and 11. Pathology from right upper lobectomy showed invasive sarcomatoid pleomorphic carcinoma with minor component of acinar adenocarcinoma (figures 3 and 4). Lymph nodes were negative for metastasis and fungal stains were negative.

OUTCOME AND FOLLOW-UP

The patient was referred to oncology and diagnosed with stage IB (T2aN0M0) sarcomatoid pleomorphic carcinoma with minor component of adenocarcinoma and underwent adjuvant chemotherapy with four cycles of docetaxel and carboplatin. Six months after her lobectomy the patient experienced worsening abdominal pain and underwent a repeat PET/CT scan that revealed a 5.1 cm×3.8 cm centrally

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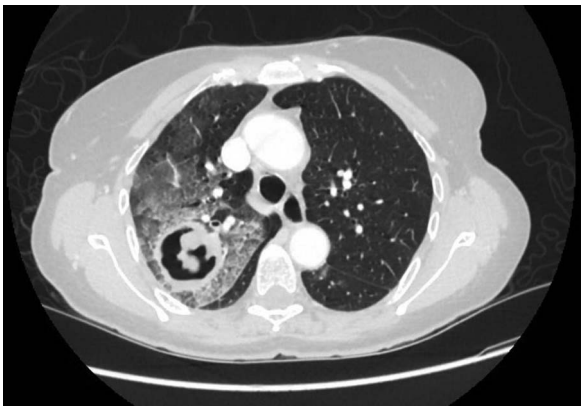

Figure 1 CT scan of chest showing right upper lung cavity lesion with thick nodular rim and surrounding ground glass opacities.

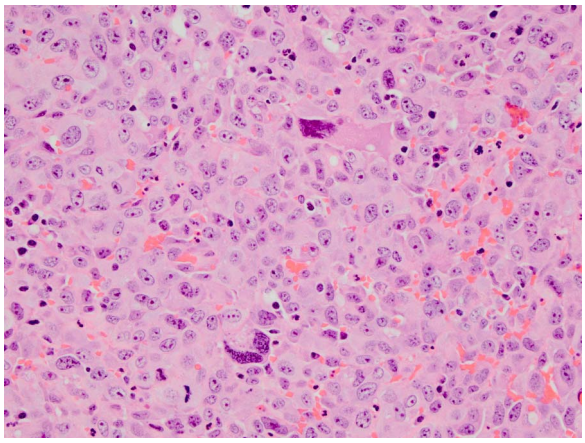

Figure 3 Right upper lobe cavitary lesion histology. Tumour with giant cells and necrosis (H&E stain, ×400).

necrotic mass in the junction of the body and tail of the pancreas causing dilation of the tail with intense fluorodeoxyglucose (FDG) uptake (SUV 16.9). The patient underwent distal pancreatectomy, partial gastrectomy, splenectomy, partial enterectomy, portal vein resection and reconstruction, and left internal jugular vein harvest. Tissue examination of her stomach and pancreas revealed metastatic pleomorphic carcinoma of lung origin and is undergoing treatment with pembrolizumab.

DISCUSSION

Sarcomatoid carcinoma of the lung is rare and accounts for <1% of lung cancers.[1] It is a general term that includes pleomorphic carcinoma, carcinosarcoma and pulmonary blastoma as these tumours are epithelial in origin but have sarcoma-like characteristics on histopathology such as spindle and giant cells. Pleomorphic carcinoma, which this patient had, is a poorly differentiated non-small cell carcinoma that contains at least 10% spindle and/or giant cells or a carcinoma consisting only of giant or spindle cells.[2] These tumours are typically discovered in male patients at an average age of 60 with a history of moderate-to-heavy smoking. On imaging the lesions are commonly found centrally or peripherally in the upper lobes. They grow by invading the bronchial tree, pulmonary parenchyma and adjacent anatomical structures in the form of widely necrotic and haemorrhagic, round-to-bosselated large masses.[2] This patient's presentation is unique as her PET/CT scan showed a right thick-walled cavitary lesion with FDG-avid uptake. The differential diagnosis for such a cavitary lesion with a thick wall and surrounding ground glass opacities includes malignancy with squamous cell carcinoma being the most common type, invasive aspergillosis, aspergilloma, mycobacterial infections, septic pulmonary emboli and necrotising pneumonia.[3] Aspergillus pneumonia detected on PET/CT scan has previously been reported with a cavitary lesion showing avid FDG uptake.[4] However, given that the patient was not immunocompromised, infection was thought to be less likely. There is one case report of a patient who presented with a left upper lobe mass initially diagnosed as *Aspergillus* pneumonia on CT-guided biopsy but on lobectomy was also diagnosed with pulmonary carcinosarcoma.[5] This case reinforces the importance of biopsy and tissue examination in determining the correct diagnosis. Pleomorphic carcinoma carries a poor prognosis with 5-year survival rate estimated at 33% and has a worse prognosis than conventional NSCLC.[6] Despite surgical resection of the tumour, recurrence and systemic metastasis is common in pulmonary pleomorphic carcinoma, as was the case with this patient.[7]

In summary, pleomorphic carcinoma can present similarly to other causes of thick-wall cavitary lesions, as PET/CT imaging may not distinguish between infection and malignancy. Tissue

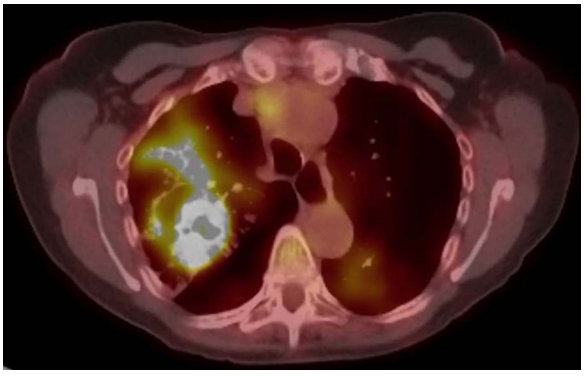

Figure 2 Positron emission tomography/CT scan showing standardised uptake value of 25.5 in right upper lung cavitary lesion.

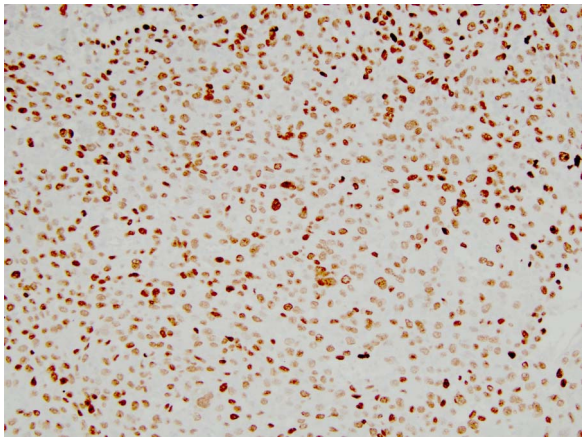

Figure 4 Tumour with staining for thyroid transcription factor 1 (TTF-1) consistent with adenocarcinoma (TTF-1, ×200).

biopsy is essential in reaching an accurate diagnosis to guide appropriate management.

Learning points

- Pleomorphic carcinoma can present in the lung as a cavitary lesion with haemoptysis.
- Tissue examination is essential in reaching the correct diagnosis.
- PET/CT imaging may not distinguish between infection and malignancy in cavitary lung disease.
- Pleomorphic carcinoma has a worse prognosis than conventional non-small-cell lung cancer (NSCLC).

Competing interests None declared.

Patient consent Obtained.

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